Course description 2025-2026
Mechanical engineering

Calculus (1) (216111)

The course covers the following main topics: the distinction between algebraic and transcendental functions, an introduction to analytic geometry, applications of differentiation, and a brief introduction to integration.

Calculus (2) (250102)

This course presents advanced principles of calculus to provide the necessary foundation for student progression. It covers the following main topics: techniques of integration, sequences and series, conic sections, and polar coordinates

General Physics (1) (216131)

This course is for first-year students majoring in engineering, physics, or other sciences. It introduces students to the basic language and ideas of physics that are found in all branches of science and technology. It provides a clear and logical presentation of the fundamental concepts and principles of physics, enhancing their understanding through a wide range of interesting real-world applications.

General Physics (2) (216132)

The course covers the main concepts, principles, methods, and results of classical physics. It primarily covers Newtonian mechanics, with topics including vectors, the dynamics and motion of a single particle in one, two, and three dimensions, and circular motion. Newton's laws of motion, work, energy and force, conservation of energy, linear momentum, rotational motion, angular momentum, general rotation and static equilibrium; elasticity and fracture.

Engineering drawing (660131 660132)

Instruments and their use, graphic geometry ,lettering, orthographic and isometric drawing and sketching, sectional views ,introduction to descriptive geometry, surface intersections and developments ,and computer (ACAD)

Engineering Workshop (1)

Developing basic skills in the fields of manual filing, turning (lathe work), welding, piping and plumbing, carpentry, sand casting, glasswork, sheet metal fabrication, and metal forming.

Programming Language (0630263)

Data types and constant/variable types. Types of operations. Input and output statements. Arithmetic, logical, and relational expressions. Type conversion. Control statements. Loop statements. Functions. Arrays. Pointers. Strings. Files. Structures. Introduction to object-oriented programming

Engineering Skills (640253)

Understanding the definition of engineering. Analyzing basic engineering problems. Proposing and evaluating design solutions. Communicating effectively within a team environment. Reading research papers and writing technical reports. Understanding professionalism and being aware of ethical responsibility. Understanding the basics of project management and planning for managing simple projects.

Statics (620211):

Study of force vectors, equilibrium of a particle, moment of a force, equilibrium of a rigid body, internal normal and shear forces, bending moment, moment of inertia and the centroid. Prerequisite: 250102+216131

Dynamics (620212):

Study of plane motion and force systems on particle, system of particles and rigid bodies. It will be an overview of the application of Newton's Laws to rectilinear and curvilinear motions. Work-energy principle, and impulse-momentum, will also be studied for particle and for rigid body. Prerequisite: 620211

Strength of materials (620213):

Study of stress, strain relation when a loads (axial, torsion, bending and buckling loads) are applied to a static solid bodies such as beams. mechanical properties of materials, pure bending, analysis and design of beam for bending, shear stress in beams, transformation of stress and strain, deflection of beams, columns, energy methods. Prerequisite: 620211

Mechanical Drawing (620232):

This course Introduce a knowledge to mechanical engineering drawing; sketching, assembly drawing, theory of orthographic projection, pictorial drawing; isometric and Oblique drawings, Sections, working drawing, dimensioning. Applications Covers Subjects Related to Mechanical Engineering Areas. The course employs Pro-Engineer software in doing exercises. Prerequisite: 660132

Material Science (620274):

The course provide a fundamental understanding of materials, its structures on different levels (from crystal cell to macrostructure), phase transformations and how it influences its mechanical, electrical, optical and magnetic properties from common science perspective. This course will introduce the various properties and structures of materials and lay a strong foundation for further study of engineering and its related disciplines. Material failure, mechanical properties of materials, and heat treatment process will also be studied. Prerequisite: 216141

Applied Engineering Mathematics (620301):

First order differential equations, second order and higher order types and solution with applications , linear algebra and vector calculus, partial differential equations types and solution with applications , complex numbers , analysis with applications . Prerequisite: 620420+650260

Finite Element Method (620302):

Finite element method development and its applications in mechanical systems such as mechanics of solids, heat transfer and dynamical systems. Prerequisite: 620301

Strength of material lab. (620314):

This laboratory serves mainly the determination of some material properties such as strain, stress, yield stress, ultimate stress, and failure stress. Destructive testing of materials (DT), micro and macro examination of materials and phase diagrams for steel are also included. Prerequisite: 620213*

Fluid Mechanics I (620320):

The course is a requirement for Mechanical Engineering students. At completing this course, the student should be able to understand fluid properties, Hydrostatics, Principle of floating objects, Buoyancy principle, Fluid in motion, Bernoulli equation, One dimensional Euler's equation, Free and forced vortices, Rotational flow equation

and pressure variation, Control volume approach, Reynolds transport theorem, Continuity equation, Impulse-Momentum principles, Energy equation, Hydraulic and energy grade lines. Prerequisite: 620212+650260

Thermodynamics I (620323):

The course is a requirement for Mechanical Engineering students. At completing this course, the student should be able to understand Basic concepts in engineering thermodynamics, Properties and behavior of pure substance and ideal gas laws, First law, Energy analysis of a closed system, Mass and energy analysis of control volumes Second law of thermodynamics and their application. Prerequisite: 216132+250102

Thermodynamics (II)(620324):

Exergy, Gas power cycles, vapor and combined power cycles, vapor compression refrigeration cycles, gas mixtures, Thermodynamics relations, Air conditioning, introduction to internal combustion chemistry. Prerequisite: 620323

Theory of Machines (620333): Simple mechanisms, velocity and acceleration analyses in mechanisms, force analysis in simple mechanisms, theory of gearing, gear trains, balancing of rotating masses, belt drive, and cams. Prerequisite: 620212

Engineering Measurements (620344):

This course is divided into three main parts: the starting part is a statistical concepts and calculations for theoretical and experimental data. The middle part concerns with the main basic circuit used to convert measured value to electrical signal and the last part includes the measuring instrument needed by mechanical engineer to measure a main physical variable such as flow, pressure, temperature, linear and angular velocities, forces and torques. Prerequisite: 610214

Engineering measurements lab. (620345):

The purpose of this laboratory is to provide students with the required skills and knowledge in using measurement tools in order to perform experiments such as; linear measurement, angular measurement, speed measurement, temperature measurement, strain gauge and Wheatstone Bridge circuit, and illumination measurement. Prerequisite: 620344*

Mechanical vibrations (620414):

Study of oscillatory motion, derivation of governing equations of motion for undammed and damped vibratory systems in free and forced motions, basics of vibration isolation, free and forced vibrations of multi degrees of freedom systems, vibration absorbers, and vibration of one-dimensional continuous systems. Prerequisite: 620212+650260

Heat transfer I (620420):

Introduction to modes of heat transfer; One-dimensional steady-state conduction; Un-steady state conduction, Lumped heat capacity systems; Introduction to convection; Hydro-dynamic and thermal boundary layers; Laminar and turbulent boundary layers, Convection in external and internal flows; Empirical relations for forced convection heat transfer; Heat exchangers. Prerequisite: 620323+650260

Thermal lab. (620427):

To provide students with the necessary skills to conduct experiments on conduction, convection, collection of data, perform analysis and interpret results to draw valid conclusions through standard test procedures. To determine thermal properties and performance of radiation heat transfer, heat exchanger, condensation, and boiling. Prerequisite: 620420*

Fluid mechanics II (620428):

The course is a requirement for Mechanical engineering students. At completing this course, the student should be able to understand Viscous flow equations of motion, Description Couette and Hell-Shaw flows, Laminar and turbulent flow boundary layers over flat plates, laminar and turbulent flow in conduits, friction factor, Darcy-Weisback equation and Moody diagrams, ,Drag and lift forces, Compressible flow, normal and oblique shock waves, significance of the Mach number, Laval nozzle, and Isentropic flow through varying area channels, Flow measurements of pressure, velocity and mass flow rates. Orifice and Venturi meter, Thrust and efficiency of a propeller, axial and radial pumps, axial and radial turbines, and specific speed. Prerequisite: 620320+610262

Fluid mechanics lab. (620429):

This course is designed for mechanical and civil engineering students in their third year. The course intends to give students a fluid properties Density and Viscosity, Center of pressure on submerged plan surface, Impact of water jet, Pipe flow Characteristics Of Centrifugal Pump(single ,series ,parallel), Pump Cavitation. Prerequisite: 620428*

Machine Design I (620434):

This course involves an introduction to design process, Design considerations, Tolerances, Fits and surface finish, Selection of materials, Mechanical properties of engineering materials, Stress analysis of machine elements, deflection equations, and failure of machine elements under static loads, Fatigue analysis, shaft design, limits and fits. Prerequisite: 620213

Machine Design II (620435):

This course involves design of mechanical engineering elements which include, design of permanent joints, welding and adhesive bonding . Design of mechanical springs, ball bearing, journal bearings, gear design especially spur gear, helical and bevel gear, clutches brakes, flywheel an belts. Prerequisite: 620434+620232

Exercises in Machine Design (620436)

This course involves design of mechanical engineering elements which include, static failure analysis, dynamic failure analysis, shaft design, design of permanent joints, welding and adhesive bonding design. Design of mechanical springs, ball bearing, journal bearings, gear design especially spur gear, helical and bevel gear, flywheel an belts.
Prerequisite: 620435*

Reversed Engineering (620437):

The course is a requirement for level 4 of mechanical engineering students. It Introduces students to Reverse Engineering Methodology and the application of these

methodologies through practical projects. It also introduces students to Fusion 360 software. Prerequisite: 620435

Production Processes (620477):

This course provides the students with the needed material for understanding the principles of Manufacturing Processes, Materials Properties Fundamentals of Metal Casting and metal for casting, mechanical properties of materials, bulk deformation processes in metal working, sheet metal, working familiar with machine operations. Prerequisite: 620274+620172

Internal combustion engine lab. (620520):

The course is a requirement for Mechanical engineering students. At completing this course, the student should be able to understand the introduction to internal combustion engines: Classifications, parts, combustion, applications. Prerequisite: 620529*

Air Conditioning (1) (620522):

Review of relevant thermodynamics and heat transfer topics; psychometric processes, Design and off design conditions, VAV systems, thermal comfort and indoor air quality, heating load calculations, Solar gain, introduction to HAP software, project. Prerequisite: 620420

Design of Sanitary Systems (620523):

This course introduces knowledge and awareness for mechanical engineering students of the importance of mechanical systems design and its applications in practice. To present Basic definitions and terms of buildings and their mechanical systems economics, cold water supply, plumping materials and fittings, hot water supply, heating and cooling systems system, pipe sizing, fir fighting network and systems, ventilation system and finally to develop an intuitive understanding of mechanical systems. Prerequisite: 620320

Internal combustion engines (620529):

This course presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer and mechanics. Discussing the design and operating characteristics of conventional spark-ignition (gasoline), compression-ignition (diesel). Thermodynamic ideal cycles are analyzed and compared to actual cycles. Fuel and air induction and exhaust processes are examined. Pollutant formation is discussed and engine operating characteristics are assessed. Prerequisite: 620324

Mechanical vibration lab. (620415): The purpose of this laboratory is to provide students with the required skills and knowledge by using mechanical vibrations concepts to perform experiments such as; Mass-spring system, Simple and compound pendulums, Mass moment of inertia (Bifilar suspension), Transverse vibration, Forced vibration with negligible damping, and undamped vibration absorber.

Prerequisite: 620414*

Engineering project I (620440):

The course is a requirement for level 4 of mechanical engineering students. It is the first part of a two semesters project, It introduces the basic principles and analysis of scientific research and technical report writing. It is mainly focused on literature review and design aspects. Presentation in front of audience and the project supervisor is required for assessment and evaluation. Prerequisite: 100 Cr Hours

Control systems lab. (620457):

This course includes performing experiments in servo control valve and open loop position control; Position control (PID); Speed control (PID); Pressure control (PID); MATLAB/ Simulink applications; LABVIEW applications. Prerequisite: 620443*

Engineering training (620499):

Field training which the mechanical engineering students should undergo in reputable factories or companies in the private or public sectors inside or outside Jordan. Prerequisite: 115 Cr Hours

Computer aided design CAD-CAM (620538):

Provide students with an introduction and basic concepts of Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) and their relationship to machine control and product development. The CAD/CAM management is addressed by explaining the production planning and control concepts to give the student a complete system overview of manufacturing facility. The course also include an introduction to Fusion 360 software. Prerequisite: 620436

Engineering project II (620540):

The course is a requirement for level 5 for all mechanical engineering students. It is the second part of a two semesters project. It introduces the student to conduct some aspects of scientific research which include, objective statement, design steps, scheduling, prototyping, simulation and testing, verifying and final product. Presentation in front of audience and the project supervisor is required for assessment and evaluation. Prerequisite:620499+620440

Entrepreneurship (610550)

The course is a requirement for level 5 Engineering students. It introduces the students to the concept of entrepreneurship and how it is related to engineering practices, also it includes the fundamentals of engineering economy. Prerequisite: 640253